

CLAIMS

What is claimed is:

- 1 1. A method comprising:
2 reading data from a memory location;
3 determining if the data read is corrupt; and
4 writing a failure codeword in the memory location if the
5 data read is corrupt.
- 1 2. The method of claim 1 wherein the memory location is a
2 nonvolatile destructive read memory location.
- 1 3. The method of claim 1 wherein the failure codeword is
2 chosen so that it has a mathematical distance greater than all
3 correctable data patterns.
- 1 4. The method of claim 1 wherein the data read is encoded by
2 an error correction code.
- 1 5. The method of claim 4 wherein the failure codeword is
2 chosen so that its mathematical distance from all correctable
3 data patterns of the error correction code is greater than the
4 minimum distance of the error correction code.
- 1 6. The method of claim 1 wherein the data read includes
2 coding bits which are utilized for error correction of the
3 data.
- 1 7. The method of claim 1 wherein determining if the data
2 read is corrupt includes,
3 decoding the data read based on an error correction code.
- 1 8. The method of claim 1 wherein determining if the data
2 read is corrupt includes,

3 determining if the data read is different from the data
4 originally written to the memory location.

1 9. The method of claim 1 further comprising:
2 writing the data to the memory location from where it was
3 read if the data is not corrupt.

1 10. An apparatus comprising:
2 a data storage device;
3 a read device coupled to the data storage device to read
4 data from a memory location in the data storage device; and
5 an error correction code decoder coupled to the read
6 device to determine if the data read is corrupt, and if so,
7 cause a failure codeword to be written to the memory location
8 from where the data was read.

1 11. The apparatus of claim 10 wherein the data storage device
2 is a nonvolatile read-destructive memory device.

1 12. The apparatus of claim 10 wherein the failure codeword is
2 chosen so that it has a mathematical distance greater than all
3 correctable data patterns.

1 13. The apparatus of claim 10 wherein the failure codeword is
2 chosen so that its mathematical distance from all correctable
3 data patterns of the error correction code is greater than the
4 minimum distance of the error correction code employed.

1 14. The apparatus of claim 10 wherein the data read is
2 corrupt if it is different from the data originally written to
3 the memory location.

1 15. The apparatus of claim 10 further comprising:
2 a write device coupled to the data storage device to
3 store data into the data storage device.

1 16. The apparatus of claim 15 wherein the write device is
2 coupled to the read device to write back the data read by the
3 read device to the memory location from where it was read if
4 the data is not corrupt.

1 17. The apparatus of claim 15 further comprising:
2 an encoding device coupled to the write device to encode
3 data according to an error correction code before it is
4 written to the data storage device.

1 18. The apparatus of claim 15 further comprising:
2 a controller coupled to the write device and the read
3 device to synchronize access to the data storage device.

1 19. A machine-readable medium comprising at least one
2 instruction to preserve the failure state of a memory
3 location, which when executed by a processor, causes the
4 processor to perform operations comprising:
5 reading data from a data storage device;
6 determining if the data read is corrupt; and
7 writing a failure codeword to the memory location of the
8 data storage device from where the data was read if the data
9 is corrupt.

1 20. The machine-readable medium claim 19 wherein the memory
2 location is a nonvolatile read-destructive memory location.

1 21. The machine-readable medium of claim 19 further
2 comprising at least one instruction which causes the processor
3 to perform operations comprising:
4 decoding the data read based on an error correction code.

1 22. The machine-readable medium of claim 21 wherein the
2 failure codeword is chosen so that its mathematical distance
3 from all correctable data patterns of the error correction

4 code is greater than the minimum distance of the error
5 correction code.

1 23. The machine-readable medium of claim 19 wherein
2 determining if the data read is corrupt includes,
3 determining if the data read is different from the data
4 originally written to the memory location.

1 24. The machine-readable medium of claim 19 further
2 comprising at least one instruction which causes the processor
3 to perform operations comprising:
4 writing the data to the memory location from where it was
5 read if the data is not corrupt.

1 25. An integrated circuit comprising:
2 a first processing unit configured to read data from a
3 data storage device; and
4 a second processing unit communicatively coupled to the
5 first processing unit to decode the read data, determine if
6 the data is corrupt, and if so, cause a failure codeword to be
7 written to the memory location from where the data was read in
8 the memory storage device.

1 26. The integrated circuit of claim 25 wherein the data
2 storage device is a nonvolatile read-destructive memory
3 device.

1 27. The integrated circuit of claim 25 wherein the second
2 processing unit decodes the read data according an error
3 correction code.

1 28. The integrated circuit of claim 25 wherein the failure
2 codeword is chosen so that its mathematical distance from all
3 correctable data patterns of the error correction code is

4 greater than the minimum distance of the error correction
5 code.

1 29. The integrated circuit of claim 25 wherein the data read
2 is corrupt if it is different from the data originally written
3 to the memory location.

1 30. The integrated circuit of claim 25 wherein the read
2 device causes the read data to be written back to the memory
3 location from where it was read if the data is not corrupt.

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